SIMULATOR EVALUATION SCENARIO COVER PAGE

PROGRAM TITLE: Unit 2 LOIT NRC Exam

SUBDIVISION: BVPS Unit 2 Simulator

SCENARIO TITLE/NO.: NRC Scenario #1

COMPUTER CODE FOR L.P.: N/A

Revision No.	Date
1	10/25/02

Revision No.	Date

INSTRUCTIONAL SETTING: Simulator

APPROXIMATE DURATION: 1.5 Hour

PREPARED BY: General Physics Corp. 8/01/2002
Date

REVIEWED BY: _____ _____
Date

APPROVED FOR IMPLEMENTATION: _____ _____
Date

Facility:	**FENOC BVPS Unit 2**	Scenario No. 1	Op Test No.: 2002-02
Examiners:	_____	Candidates:	_____ CRS
	_____		_____ RO
	_____		_____ PO
Objectives:	Demonstrate the ability to safely operate the plant during normal and upset conditions in accordance with plant procedures.		
Initial Conditions:	**IC 128 PW = NRC1**: 100% power, Equ. Conditions, BOL, CB "D" at 225 steps, RCS boron 1576 ppm.		
Turnover:	2FWE*P23B OOS & will not be returned. Perform a normal power reduction to remove Main Feed Pump 2FWS-P21A from service.		
Critical Tasks:	**FR-S.1.C, Insert RCCAs.**		
	E-1.C, Stop RCPs.		

Event No.	Malf. No.	Event Type*	Event Description.
1		N (US) N (PO) R (RO)	Normal power reduction.
2	CNH CFW12	C (PO) C (US)	"B" SG MFRV sticks in position during power reduction, (Manual operation available).
3	BKR HIV01	C (PO)	Loss of 4160V bus 2AE.
4	BKR HIV11	C (US)	2-1 EDG output breaker fails to close; manual closure available.
		C (RO) C (US)	Manual start of 2CHS*P21B.
5	CNH PCS10A	I (RO) I (US)	Pressurizer Pressure Master Controller fails high.
6	IOR XB1I035C RCS10A	M (ALL)	PORV fails open; PORV block valve leaks after being closed leading to reactor trip.
7	PPL01A PPL01B	C (RO) C (US)	ATWS.
8	BKRHIV13	C (US)	EDG No. 2 output breaker fails to close automatically (manual closure successful).

(N)ormal, (R)eactivity, (I)nstrument, (C)omponent, (M)ajor

After taking the shift, the crew will lower power in preparation for removing a main feed pump from service.

After lowering power, the "B" SG Main Feedwater Regulating Valve (MFRV) sticks in position as the power reduction continues, resulting in a slowly rising SG level, requiring manual control of the sticking MFRV.

When SG level is stable with the MFRV in manual, a loss of 4160 Volt Emergency Bus "2AE" results in loss of the running charging pump (2CHS*P21A). EDG No. 2-1 will automatically start but its output breaker fails to automatically close and must be manually closed. Due to loss of 2CHS*P21A, the crew may start 2CHS*P21B while evaluating the manual closure of EDG 2-1 output breaker 2E10. When EDG 2-1 breaker is closed, crew will secure 1 charging pump.

After recovering, the Pressurizer Master Pressure Controller fails high, a PORV opens, Pressurizer heaters turnoff, spray valves open, and RCS pressure decreases. Manual control of Pressurizer heaters and spray valves is available; however, the PORV will remain stuck open and Pressurizer pressure will lower until the reactor automatically trips or the Unit Supervisor directs a manual reactor trip. When the crew attempts to close the PORV block valve, the block valve will shut, but will leak. The PORV will remain open and the block valve will leak for the duration of the scenario.

After the reactor is tripped, an ATWS occurs. Also following the reactor trip, the System Station Service Transformer "2B" trips, and EDG No. 2-2 output breaker 2F10 fails to close automatically but can be closed manually, restoring power to 4160 Volt Emergency Bus "2DF".

Expected procedure flow path is E-0 → FR-S.1→ E-0 → E-1.

Program Title 2002 NRC Examination Initial Conditions REV 1

INITIAL CONDITIONS: IC 128 PW = NRC1

100% BOL EQU XE, CBD = 225, RCS boron = 1576 ppm

ADDITIONAL LINEUP CHANGES	STICKERS	VOND MARKINGS
2FWE*P23A	2FWE*P23A YCT	N/A
EQUIPMENT STATUS	**DATE/TIME OOS**	**TECHNICAL SPECIFICATION(S)**
2FWE*P23A	24 hours ago	TS 3.7.1.2, Action b

SHIFT TURNOVER INFORMATION

1. 100%, BOL, EQU XE 1576 ppm CB "D" 225 steps.
2. Reduce power to remove 2FWS-P21B from service due to bearing high vibration.
3. Severe weather is expected.
4. 2FWE*P23A is OOS for motor replacement. Motor is removed and the pump will not be returned this shift.

SCENARIO SUPPORT MATERIAL REQUIRED
Power reduction reactivity plan.
Load Follow Procedure 2OM-52.4.B, step IV.B.1.

INSTRUCTION GUIDELINES	PLANT STATUS OR RESPONSE	OBJECTIVE	EXPECTED STUDENT RESPONSE

Shift positions:

US _____

RO _____

PO _____

EVENT #1

Following the Reactivity Plan, Crew lowers reactor power toward 60%.

Lower reactor power ~5%.

Turbine load and reactor power reduction at 12%/Hr or less

US directs load decrease. Initiates turbine load decrease.

PO initiates turbine load decrease.

RO initiates RCS boration as necessary to maintain $T_{avg} - T_{ref}$.

EVENT #2

"B" FWRV sticks after power has been lowered ~5%.

"B" FWRV sticks in position. "B" SG Feed flow rises. "B" NR level rises.

IMF CNH-CFW12 (0 0) 1

NOTE: Level deviation dependent on time of establishing normal MFRV control to restore "B" SG level.

Alarm received:
A6-E10, SG 2B Level Deviation from Setpoint

PO notes problem with "B" SG level control, valve and takes manual control of 2FWS*FCV488, inform US.

Crew refers to ARP's.

INSTRUCTION GUIDELINES	PLANT STATUS OR RESPONSE	OBJECTIVE	EXPECTED STUDENT RESPONSE
			US directs PO to restore "B" SG level to program value. US notifies I&C of 2FWS*FCV488 problem.
EVENT #3			
IMF BKR-HIV01 (0 0) 0 **IMF BKR-HIV11 (0 0) 2** **(preload)**	2DF bus remains energized. 2AE bus is deenergized. No. 1 EDG output breaker fails to shut automatically.		
Loss of 4160V Emergency Bus 2AE.			PO determines 2AE bus deenergized.
	Alarms received: [A8-C2], 4160V Emer Bus 2AE Undervoltage. [A8-A2], 4160V Emer Bus 2AE ACB 2A10/2E7 Auto Trip.		Crew responds per ARPs.
			US/PO determine at least one AC emergency bus energized. RO determines that no charging pumps are operating. US directs RO to start 2CHS*P21B.
	2CHS*P21B running.		RO closes 2CHS-FCV122 & 2CHS-HIV186 then starts 2CHS*P21B. PO recognizes failure of ACB-2E10 to auto shut and informs US.

INSTRUCTION GUIDELINES	PLANT STATUS OR RESPONSE	OBJECTIVE	EXPECTED STUDENT RESPONSE
			Crew responds per 2OM-36.2.
	Running charging pump, 2CHS*P21A, CCP pump, 2CCP*P21A, and Service Water pump, 2SWE*P21A, deenergized.		US directs PO to shut ACB-2E10, No. 1 EDG output breaker, and reenergize bus 2AE.
	EDG No. 1 output breaker shut. 4160V bus 2AE re-energized.		PO manually shuts ACB-2E10, EDG No. 1 output breaker and re-energizes bus 2AE.
	Loads sequence onto 2-1 EDG.		RO ensures CCP flow to all RCP thermal barriers.
	2 charging pumps operating.		RO reports charging pump status.
Crew discretion as to which charging pump is secured.			US directs RO to secure 1 charging pump.
	2CHS*P21A or B secured.		RO secures 1 charging pump.
			US refers to T.S. 3.0.5 and 3.8.1.1
IF requested insert:			
IRF DSG005 (0 0) 1	Reset of 2-1 EDG oil pump shunt trip.		

INSTRUCTION GUIDELINES	PLANT STATUS OR RESPONSE	OBJECTIVE	EXPECTED STUDENT RESPONSE

EVENT #4

IMF CNH-PCS10A (0 0) 100

Pressurizer Master Pressure Controller, [2RCS*PK444A], output fails high.

PORV, [2RCS*PCV455C], open, PZR control heaters turn off, spray valves open, RCS pressure decreases rapidly.

RO notes indications and alarms, informs US.

Alarms received:
[A4-A1], Pressurizer Power/Safety Relief Valve Trouble.
[A4-D1], Pressurizer Control Pressure High/Low.
[A4-E1], Pressurizer Control Pressure Deviation High/Low.
[A4-F1], Pressurizer PORV Open Permissive.
[A4-H3], Pressurizer Relief Tank Trouble.

US refers to ARP's.

RO notes failure of Pressurizer Master Pressure Controller and informs US.

INSTRUCTION GUIDELINES	PLANT STATUS OR RESPONSE	OBJECTIVE	EXPECTED STUDENT RESPONSE
	Manual Control of PZR Master Pressure Controller fails to close PORV, fails to control heaters, and fails to control spray valves.		US directs RO to place PZR Master Pressure Controller in manual, close spray valves and PORV and take manual control of PZR heaters.
EVENT 5 (partial)	Spray valves close. PZR heaters energized.		RO uses individual component controls to shut spray valves and take manual control of PZR heaters, and attempts to close PORV.
IOR XB1IO35C (0 0) 0 (preload)	PORV remains open. RCS pressure continues to decrease due to PORV failure. Charging flow increases.		
PORV Block Valve leaks after closing	PORV Block Valve closed.		Crew identifies PORV remains open.
	RCS pressure continues to lower due to leaking PORV Block Valve.		US directs PORV Block Valve closed. RO closes valve.
			US contacts I&C to investigate failure.
EVENT 5 At examiners discretion: **IMF RCS10A (0 0) 0.5**	PORV Block Valve leaking.		
RAMP SMLRCS10(1) 0.05 1.0 60 (block valve leakage increases)	RCS pressure continue to decrease due to stuck open PORV and leaking block valve. Charging flow remains high.		RO monitors RCS, identifies that RCS pressure is continuing to decrease.
	RCS pressure dropping. Charging flow rising.		US directs a manual reactor trip.

INSTRUCTION GUIDELINES	PLANT STATUS OR RESPONSE	OBJECTIVE	EXPECTED STUDENT RESPONSE
IMF PPL01A (0 0) 1 (preload) **IMF PPL01B (0 0) 1 (preload)**	Manual reactor trip or automatic pressurizer pressure low reactor trip.		RO places reactor trip switch to trip. Crew identifies that the reactor failed to trip.
ATWS – Reactor fails to trip automatically or when Manual trip is attempted.			
Steps 1 - 5 of FR-S.1 are immediate actions.			Operators commence immediate actions for E-0 and FR-S.1. US refers to E-0 and makes transition to FR-S.1. SNA requested to monitor CSF status trees.
<u>CT#1 – FR-S.1.C:</u> **Crew inserts negative reactivity into the core by inserting RCCA's before completing the immediate action steps of FR-S.1.**	Rods inserting.		RO uses auto or manual rod control to insert rods. **CT#1 S/U** Crew sounds standby alarm and announces Unit 2 reactor trip failure.

INSTRUCTION GUIDELINES	PLANT STATUS OR RESPONSE	OBJECTIVE	EXPECTED STUDENT RESPONSE
After directed to locally open RTB's, insert: **IMF PPL02A (10 120)** **IMF PPL02B (10 130)** **IRF LOA-CRF007 (10 150)** **IRF LOA CRF008 (10 160)** **TRG! 10**	Reactor tripped (time delay). MG sets secured (time delay).		Crew dispatches an operator to locally open the RTB's. **CT#1 S/U**
Report RTB's manually opened & MG sets secured.			SM informed to evaluate EPP.
	Turbine manually tripped.		PO manually trips turbine.
	Throttle, governor, reheat stop, and interceptor valves all closed.		PO verifies turbine trip.
	Steam dump bypass interlock selector switches in OFF.		PO places Condenser Steam Dump Selector Switches in "OFF".
FR-S.1 immediate actions complete.	MSR steam supply block valves closed. Reheat controller reset.		PO ensures reheat steam isolation and depresses reheat controller "RESET" pushbutton.
NOTE: The following actions will not occur until **AFTER** the reactor trip breakers are opened, therefore, may occur at later time in scenario.			
IMF SWD02C (2 45) (preload)	SSST 2B trips 45 seconds after reactor trip.		
IMF BKR-HIV13 (0 0) 2 (preload)	2-1 EDG output bkr fails to auto close.		

INSTRUCTION GUIDELINES	PLANT STATUS OR RESPONSE	OBJECTIVE	EXPECTED STUDENT RESPONSE
	2C, 2D & 2DF buses deenergized.		PO reports loss of 2B SSST and 2-1 EDG output breaker auto closure failure. US directs PO to close 2F10 breaker and verify loads sequence on EDG.
	2F10 closed, 2DF energized, loads sequencing on EDG.		PO closes 2F10 and reports loads sequencing.
	2FWE*P23A on clearance. 2FWE*P23B running. TDAFW pump steam supply valves open. AFW throttle valves full open.		PO verifies AFW status.
	HHSI pumps running. 2CHS*MOV350 open. Boric acid transfer pump running. Emergency boration flow > 30 gpm. Charging flow path aligned through 2CHS*FCV122 with > 40 gpm flow.		RO initiates emergency boration of RCS.
	PZR pressure < 2335 psig.		RO checks PZR pressure less than 2335 psig.
	A5-4G, PZR LOW PRESSURE SAFETY INJECTION/ REACTOR TRIP lit.		Crew checks SI signal status, performs first ten steps of E-0 when time permits.

INSTRUCTION GUIDELINES	PLANT STATUS OR RESPONSE	OBJECTIVE	EXPECTED STUDENT RESPONSE
	S/G levels < 12% NR.		PO checks S/G levels, verifies AFW flow is greater than 700 gpm. PO controls feed flow to maintain 12 (31% adverse) - 50% S/G NR level.
	2CHS*FCV113B closed. 2CHS*FCV114A closed. 2CHS*FCV114B closed.		RO verifies dilution paths isolated.
	Uncontrolled cooldown not in progress.		RO monitors RCS for uncontrolled cooldown. US transitions to Step 16 of FR-S.1.
	Core exit temperatures less than 1200°F.		Crew verifies core exit temperatures.
	PR NI's less than 5%. IR NI's negative SUR.		RO verifies reactor subcritical. US makes transition from FR-S.1 back to E-0. Directs crew to perform E-0 immediate actions.
Steps 1 - 7 of E-0 are immediate actions.	Reactor locally tripped. Rods bottom lights lit. Flux decreasing.		RO verifies reactor trip.
Previously completed.			RO sounds standby alarm and announces Unit 2 safety injection.
Previously requested.			SM informed to evaluate EPP.

INSTRUCTION GUIDELINES	PLANT STATUS OR RESPONSE	OBJECTIVE	EXPECTED STUDENT RESPONSE
	Throttle or governor valves closed, reheat stops or interceptor valves closed.		PO verifies turbine trip.
	MSR steam supply block valves closed. Reheat controller reset pushbutton depressed.		PO ensures reheat steam isolation.
	Main generator output breakers open. Main generator volts ZERO. Exciter circuit breaker open.		PO verifies generator trip.
	2AE and 2DF busses energized.		PO verifies power to AC emergency busses.
	A5-4G, PZR LOW PRESSURE SAFETY INJECTION/ REACTOR TRIP lit. SI actuation status light, A12-1D lit.		Crew checks if SI is actuated/ required.
E-0 immediate actions complete.	Both trains of SI manually initiated.		US directs RO to manually initiate SI (both trains).
			US direct operators to verify automatic actions by performing Attachment A-0.11, "Verification of Automatic Actions" when time permits.
	Automatic actions of A-0.11 are SAT with the following exceptions: **2FWE*P23A OOS at turnover.**		Operator assigned to perform Attachment A-0.11 reports status of Attachment to US/crew and any actions taken when completed.

INSTRUCTION GUIDELINES	PLANT STATUS OR RESPONSE	OBJECTIVE	EXPECTED STUDENT RESPONSE
	Leak collection filtered exhaust fan status SAT		Crew verifies Leak collection filtered exhaust fan status.
	RCS temperature trending to 547F		RO reports Tavg status, US directs crew to control steam/feed flow as necessary to achieve desired status.
	Recirc spray pumps not running.		RO checks recirc spray pump status.
	PZR pressure < 2310 psig.		RO checks PZR isolated. PRT conditions normal.
	PORV, [2RCS*PCV455C], failed open. PORV block valve shut but leaking.		RO verifies PORV Block Valve shut for open PORV.
Crew enters E-1.			US enters E-1 and announce entry to Crew.
	Radiation not in alarm status and CIB has not occurred.		PO checks Control Room habitability.
<u>CT#2 – E-1.C:</u> **Crew trips all RCP's when RCS to highest S/G D/P criteria is exceeded and SI flow verified prior to exiting procedure E-1.**	RCP's secured.		RO checks if RCP's should be stopped. **CT#2 S/U**
	Recirc spray pumps not operating.		RO reports Recirc Spray pmp status.
	Both CNMT hydrogen analyzers operating.		RO reports H2 analyzer status.

INSTRUCTION GUIDELINES	PLANT STATUS OR RESPONSE	OBJECTIVE	EXPECTED STUDENT RESPONSE
	No S/G's faulted.		PO checks if S/G's are faulted.
	AFW flow > 340 gpm.		PO checks intact S/G levels and control levels.
	Power available to block valves.		RO checks PRZR PORV and block valves.
	PORV open. PORV Block Valve [2RCS*MOV535] shut but leaking.		RO verifies PORV block valve shut.
	No SG levels rising in an uncontrolled manner.		PO checks is SG tubes are intact.
	Subcooling < 43°F.		Crew checks if SI flow can be terminated.
	Adequate secondary heat sink.		Crew determines SI flow CANNOT be terminated
	RCS pressure NOT stable or rising.		
Terminate the scenario when the crew determines that SI flow cannot be terminated.			

SIMULATOR EVALUATION SCENARIO COVER PAGE

PROGRAM TITLE: Unit 2 LOIT NRC Exam

SUBDIVISION: BVPS Unit 2 Simulator

SCENARIO TITLE/NO.: NRC Scenario #2

COMPUTER CODE FOR L.P.: N/A

Revision No.	Date
1	10/25/02

Revision No.	Date

INSTRUCTIONAL SETTING: Simulator

APPROXIMATE DURATION: 1.5 Hour

PREPARED BY: General Physics Corp. 8/01/2002
Date

REVIEWED BY: _____ _____
Date

APPROVED FOR IMPLEMENTATION: _____ _____
Date

SIMULATOR EVALUATION SCENARIO COVER PAGE

PROGRAM TITLE: Licensed Operator Initial Training

SUBDIVISION: BVPS Unit 2

SCENARIO TITLE/NO. Scenario #2

COMPUTER CODE FOR L.P.

Revision No.	Date

Revision No.	Date

INSTRUCTIONAL SETTING: SIMULATOR

APPROXIMATE DURATION: 1.5 Hours

PREPARED BY: General Physics Corp. 8/1/2002

_____ _____
Date

REVIEWED BY:

_____ _____
Date

APPROVED FOR IMPLEMENTATION:

_____ _____
Date

Facility:	**FENOC BVPS Unit 2**	Scenario No. 2	Op Test No.: 2002-02
Examiners:	_____	Candidates:	_____ CRS
	_____		_____ RO
	_____		_____ PO
Objectives:	Demonstrate the ability to safely operate the plant during normal and upset conditions in accordance with plant procedures.		
Initial Conditions:	**IC 127 PW = NRC2:** 9% pwr, BOL, EQU XE, RCS boron = 2080 ppm, CB "D" = 116 steps.		
Turnover:	Continue plant startup.		
Critical Tasks:	**E-0.I, Manually start HHSI pump.** **E-3.A, Isolate SG.** **E-3.B, Cooldown RCS.** **E-3.C, Depressurize RCS.**		

Event No.	Malf. No.	Event Type*	Event Description
1		R (RO) N (PO) N (US)	Continue plant startup.
2	NIS07B	C (US)	Intermediate Range instrument power fuse blows.
3	XMT MSS044A	I (PO) I (US)	PT-464 fails low causing condenser steam dumps to close.
4	CNH MSS03B	C (PO) C (US)	SG "B" atmospheric dump valve fails open.
5	RCP06B RCP01B	C (RO) C (US)	"B" RCP high vibration with rising seal leakoff flow.
6 7	RCS04B PMP CHS002 PLP07A	M (ALL) C (RO)	"B" SG Tube Rupture. Running HHSI pump trips. Standby HHSI pump fails to auto start (manual start available).

(N)ormal, (R)eactivity, (I)nstrument, (C)omponent, (M)ajor

After taking the shift, the crew will continue the startup. An Intermediate Range channel instrument power fuse blows after power is > 10%. The RO verifies which instrument channel has failed, and the Unit Supervisor directs actions per the AOP and refers to Technical Specifications.

After referencing Technical Specifications, PT-MS-464 fails low causing the condenser steam dumps to close. Tavg rises causing automatic opening of the atmospheric steam dump valves. Operator action is required to place the condenser steam dump controller in manual and re-open the valves.

An atmospheric steam dump valve then fails open requiring the crew to place the valve controller in manual and stabilize plant conditions.

After plant conditions have stabilized, RCP "2B" high vibration condition develops and continues to worsen. The crew will eventually trip the reactor and take the pump out of service.

Following the reactor trip, a SGTR occurs on SG "B", additionally, the running HHSI pump trips and the standby HHSI pump fails to auto start, but can be manually started.

Expected procedure flow path is E0 → E3.

Program Title 2002 NRC Examination Initial Conditions REV 1

INITIAL CONDITIONS: IC 127 PW = NRC2

9% BOL EQU XE, CBD = 116, RCS boron = 2080 ppm.

ADDITIONAL LINEUP CHANGES	STICKERS	VOND MARKINGS
EQUIPMENT STATUS	**DATE/TIME OOS**	**TECHNICAL SPECIFICATION(S)**

SHIFT TURNOVER INFORMATION

1. Plant is at 9% power, BOL, EQU XE, CB "D" at 116 steps, RCS boron = 2080 ppm.
2. Continue the plant S/U to 100% IAW 2OM-52.4.A step IV.3.
3. Severe Weather is expected.

SCENARIO SUPPORT MATERIAL REQUIRED
2OM-52.4.A step IV.3.
Reactivity plan.

INSTRUCTION GUIDELINES	PLANT STATUS OR RESPONSE	OBJECTIVE	EXPECTED STUDENT RESPONSE

Shift positions:

US _____

RO _____

PO _____

EVENT #1

Reactor Power Increase.

		Crew commences power increase in accordance with reactivity plan.
Continue reactor startup.	Reactor at 9% power.	
		RO commences raising reactor power to between 10 and 20%.
	Status lights on Panel 308 actuate at 10%.	RO verifies P-10 bistables actuate as required as power increases to > 10%.
	[A12-2B], NIS IR Trip Blocked, is ON.	RO blocks the IR Trip and Rod Stop and verifies annunciator ON.
	[A12-2C], Power Range Low Setpoint Trip Blocked, is ON.	RO blocks Power Range low Overpower Trip and verifies annunciator ON.
	[A12-1H], NOT P-7 is OFF.	RO verifies that annunciator NOT P-7 is OFF.

INSTRUCTION GUIDELINES	PLANT STATUS OR RESPONSE	OBJECTIVE	EXPECTED STUDENT RESPONSE
			RO selects highest Power Ranges on N45.
EVENT #2 IRNI blown fuse. After Crew has raised reactor power to greater than 10% and IR trips have been blocked, **IMF NIS07B (0 0) 0** NI-36 Instrument power fuse fails.	Meters for NI-36 indicate zero and blown fuse indication exists on drawer. [A4-4G], NIS Detector/Compensator Loss of Voltage.		RO acknowledges ANN's and identifies N-36 as the failed channel. RO reports diagnosis to US. RO refers to ARPs. US refers to AOP 2.2.1B, Intermediate Range Channel Malfunction. Verifies Unit is in Mode 1 and goes to Step 4. Crew verifies power still greater than 10% and intermediate range trip is still blocked. Crew places Level Trip Switch on failed channel to BYPASS.

INSTRUCTION GUIDELINES	PLANT STATUS OR RESPONSE	OBJECTIVE	EXPECTED STUDENT RESPONSE
			Crew places Caution Tag on Source Range, which states "Manually unblock Source Range on Shutdown". Crew places Caution tag on Level Trip Switch of failed channel. US references Technical Specification 3.3.1.1. US directs the Crew to continue with unit startup. RO withdraws rods as directed. RO/PO maintain reactor power, T_{avg}, and SGWL in preparation for unit synchronization.
EVENT #3			
After the startup continues	2MSS*PT464 fails low.		PO determines Condenser steam dumps closed and informs US/RO.
IMF XMT-MSS044A (0 0) 0	Condenser Steam Dump Valves close. Condenser Steam Dump demand 2RCS-TI408 indicates zero. 2MSS-PI464A indicates zero. Tavg rising. Atmospheric Dump Valves open automatically.		PO identifies failure of 2MS*PT464 and informs US.

INSTRUCTION GUIDELINES	PLANT STATUS OR RESPONSE	OBJECTIVE	EXPECTED STUDENT RESPONSE
	Alarms received: [A6-7A], Steamline Pressure High. Condenser Steam Dumps reopened.		US directs RO to take manual control of steam dumps. RO opens Condenser Steam Dumps in manual. US contacts I&C to investigate.
EVENT #4			
IMF CNH-MSS03B (3 0) 100 (preload)	"B" SG Atmospheric Dump Valve fails open. SG level deviation alarms may actuate.		PO identifies failed open Atmospheric Dump Valve and informs US. US directs PO to take manual control of open ADV, and close the ADV. RO places controller for "B" SG ADV in manual and closes ADV. US requests I&C assistance. US may refer to LR 6.1 for inoperable atmospheric dump valve.

INSTRUCTION GUIDELINES	PLANT STATUS OR RESPONSE	OBJECTIVE	EXPECTED STUDENT RESPONSE

EVENT #5

Insert the following:

IMF RCP01B (0 0) 1 300

RCP 21B Seal Leakoff rising as indicated on 2CHS-FR154A.

RO acknowledges RCP vibration alarm, informs US, refers to ARP A2-5C. Crew trends RCP vibration.

IMF RCP06B (0 0) 15

[A2-5C], Reactor Coolant Pump Vibration Alert/Danger.

US enters AOP-2.6.8.

IMF RCP06B (0 0) 21 1800

RCP 21B Vibration rises to >16 mils.

US proceeds to step 2.d of AOP 2.6.8 to address vibration problem.

Shaft vibration > 15 mils and rising at > 1.0 mils/hr.

When it is determined that RCP vibration is > 15 mils rising at >1 mil/Hr the US will direct a reactor trip and direct the stopping of RCP 21B after E-0 Immediate Actions are completed.

EVENT #6

RO manually trips reactor.

IMF RCS04B (2 0) 500 (preload)

"B" SGTR when the reactor is tripped.

RO informs US of a reactor trip.

Steps 1 –7 of E-0 are immediate actions.

RO/PO commence IMAs of E-0, US reference E-0 to verify IMAs.

INSTRUCTION GUIDELINES	PLANT STATUS OR RESPONSE	OBJECTIVE	EXPECTED STUDENT RESPONSE
	Turbine trip due to reactor trip alarm A5-6D lit. Rod bottom lights lit. Neutron flux dropping.		RO verifies reactor trip.
			RO sounds standby alarm, announces Unit 2 reactor trip.
			SM evaluates EPP.
	Throttle or governor valves closed. Reheat stops or interceptors closed.		PO verifies turbine trip.
	MSR steam supply block valves closed. Reheat controller reset pushbutton depressed.		PO ensures reheat steam isolation.
	Output breakers open. Main generator volts ZERO. Exciter ACB open.		PO verifies generator trip.
	2AE and 2DF busses energized.		PO verifies power to AC emergency busses.

INSTRUCTION GUIDELINES	PLANT STATUS OR RESPONSE	OBJECTIVE	EXPECTED STUDENT RESPONSE
NOTE: SI may not have actuated at this time however, RCS conditions are degrading due to "B" SGTR. If crew transitions to ES-0.1 at this time, they will be required to manually actuate SI and return here. **This drill assumes SI is actuated at this time and the crew continues with E-0.**			
	SI actuated on low PZR pressure A5-4H.		RO reports SI status, manually actuates SI.
Immediate actions of E-0 complete.			US directs RO to secure "B" RCP due to high vibration/seal leakoff trouble.
	"B" RCP secured.		RO secures "B" RCP.
			US direct operators to verify automatic actions by performing Attachment A-0.11, "Verification of Automatic Actions" when time permits.
	Automatic actions of A-0.11 are SAT with the following exceptions: **2CHS*P21A failed to auto start on SI, manual start is successful.** **2CHS*P21B tripped on SI and cannot be manually restarted.**		Operator assigned to perform Attachment A-0.11 reports status of Attachment to US/crew and any actions taken when completed.

INSTRUCTION GUIDELINES	PLANT STATUS OR RESPONSE	OBJECTIVE	EXPECTED STUDENT RESPONSE
CT#1 – E-0.I: **Crew establishes flow from at least one high head ECCS pump before transition out of E-0.**	2CHS*P21A manually started.		PO manually starts "A" HHSI pump & reports actions/status to US. **CT#1 – S/U**
	Leak collection filtered exhaust fan status SAT.		Crew verifies Leak collection filtered exhaust fan status.
	RCS temperature trending to 547F.		RO reports Tavg status, US directs crew to control steam/feed flow as necessary to achieve desired status.
	Recirc spray pumps not running.		RO checks recirc spray pump status.
	PORVs closed (not leaking). Spray valves closed. Safeties closed (PSMS data). PRT conditions normal. PORV/block valve alignment SAT.		RO checks PRZR isolated.
	"B" RCP previously secured. "A&C" RCPs running. CCP flow normal.		RO checks if RCPs should be stopped.
	No SG pressure dropping in an uncontrolled manner.		PO checks if any SGs are faulted.

INSTRUCTION GUIDELINES	PLANT STATUS OR RESPONSE	OBJECTIVE	EXPECTED STUDENT RESPONSE
	"B" SG level rising in an uncontrolled manner. Secondary rad monitors not consistent with pre-event levels.		US directs operator to check if SG tubes are intact.
Crew transitions to E-3.			US makes transition to E-3 and informs crew. US directs SNA to monitor status trees.
	Control room habitability system not required.		PO verifies control room habitability.
	"B" RCP previously secured. "A&C" RCPs running. CCP flow normal.		RO/PO check if RCPs should be stopped.
<u>CT#2 – E-3.A:</u> **Crew isolates feed flow into and steam flow from the ruptured SG and directs operator to close isolations valve(s) operated from outside of the control room before a transition to ECA-3.1 occurs.**	"B" SG level rising in an uncontrolled manner. Secondary rad levels higher than normal.		Crew identifies ruptured SG.

INSTRUCTION GUIDELINES	PLANT STATUS OR RESPONSE	OBJECTIVE	EXPECTED STUDENT RESPONSE
	Adjust ruptured SG atmospheric steam dump controller setpoint to 100% and verify 2SVS*PCV101B closed. 2SVS*HCV104 – closed. 2SVS*28 – closed. 2MSS*16 – closed. 2BDG*AOV100B1 – closed. 2SDS*AOV111B1 – closed. 2SDS*AOV129A – closed. 2MSS*AOV101B, 102B – closed.		Crew isolates flow from ruptured SG. **CT#2 S/U**
IRF LOA-MSS010 (0 0) 0 **IRF LOA-AFW026 (0 0) 0**			
Notify crew that 2MSS*16 is closed. Also report 2SVS*28 closed when requested.	Verify closed "B" SG steam supply to TDAFW pump 2MSS*16 and to RHR valve 2SVS*28.		
	"B" SG narrow range level greater than 12%.(31% adverse).		PO checks ruptured SG level. **CT#2 S/U**
	2FWE*HCV100C & D closed. Main feedwater isolation valve 2FWS*HYV157B closed. Main feed reg valve 2FWS*FCV488 closed. Main feed bypass valve 2FWS*FCV489 closed.		PO isolates feed flow to "B" SG. **CT#2 S/U**
	Ruptured SG pressure > 240 psig.		PO verifies ruptured SG pressure greater than 240 psig.

INSTRUCTION GUIDELINES	PLANT STATUS OR RESPONSE	OBJECTIVE	EXPECTED STUDENT RESPONSE
CT#3 – E-3.B: **Crew establishes/maintains an RCS temperature so that transition from E-3 does not occur because the RCS temperature is in either of the following conditions: Too high to maintain minimum required subcooling for subsequent RCS depressurization, OR. Below the RCS temperature that causes a red or orange path challenge to Sub-criticality or Integrity CSF.**	Based on ruptured SG pressure. 1000 – 1084 = 505F (480F). 900 – 999 = 492F (467F).		US determines target temperature for cooldown. **CT#3 S/U**
			RO blocks low steamline pressure SI when PRZR pressure is less than 1950 psig.
	Steam dump is available, greater than 100°F per hour cooldown.		PO selects steam dump to steam pressure mode and dumps steam at maximum rate. **CT#3 S/U**
			SNA monitors thermocouples.
	Condenser steam dump controller in auto with pot setting corresponding to current intact SG pressure.		PO stops cooldown when core exit TCs < target temperature. **CT#3 S/U**

INSTRUCTION GUIDELINES	PLANT STATUS OR RESPONSE	OBJECTIVE	EXPECTED STUDENT RESPONSE
	Intact SG levels > 12% (31% adverse).		PO controls intact SG feed flow as required (340 gpm min) to achieve/maintain levels between 12% (31%) and 50%.
	Power to PORVs & block valves SAT. PORVs closed, not leaking. PORV/Block alignment SAT.		RO verifies PORV/block valve conditions as expected.
	Auto SI blocked A12-1C lit. SI signal A12-1D not lit.		RO resets SI (both trains).
	Both trains of CIA reset. CIB not actuated.		RO resets CIA and CIB (both trains).
	Station Air available.		PO verifies/reports status of station air system.
	Instrument air established to CNMT. 2IAC-MOV131 – open. 2IAC-MOV130 – open. Inst Air HDR pressure > 85 psig.		Crew establishes Instrument Air to CNMT.
	RCS pressure > 225# (250# adverse). LHSI Pmps stopped, in auto.		RO stops LHSI pumps and places them in auto.
	Cooldown stopped when at target temperature.		Crew monitors temperature and stops cooldown at target temperature.

INSTRUCTION GUIDELINES	PLANT STATUS OR RESPONSE	OBJECTIVE	EXPECTED STUDENT RESPONSE
	Ruptured SG pressure stable.		PO verifies ruptured SG pressure stable.
	Subcooling > 61F (79F adverse).		Crew verifies Subcooling sat.
CT#4 – E-3.C: **Crew depressurizes RCS to meet SI termination criteria before water release from the ruptured SG Safety or Atmospheric Relief Valve.**	PZR level < 75% (61%). RCS subcooling > 41F (59F). 21A & 21C RCPs running. Spray valves available. Both spray valves open. **IF AVAILABLE**, 1 PORV will be used to assist depressurization.		RO depressurizes RCS to minimize break flow and refill PRZR. **CT#4 S/U**
	Depressurization Termination: PZR level >75% (61%) **OR** RCS subcooling < value listed on Attachment A-5.1 **OR BOTH** RCS pressure < ruptured SG pressure, and PRZR level > 17% (38%).		RO closes spray valves and PORV if used. **CT#4 S/U**

INSTRUCTION GUIDELINES	PLANT STATUS OR RESPONSE	OBJECTIVE	EXPECTED STUDENT RESPONSE

Terminate scenario upon completion of RCS depressurization.

Erase any vond marks associated with this drill.

EPP classification is an ALERT based on EPP/I-1b Tab 1.2, RCS Barrier.

SM declares an Alert within 15 minutes of entering E-3 (per TAB 1.2.4), informs crew, provides AA with notification form.

SIMULATOR EVALUATION SCENARIO COVER PAGE

PROGRAM TITLE: Unit 2 LOIT NRC Exam

SUBDIVISION: BVPS Unit 2 Simulator

SCENARIO TITLE/NO.: NRC Scenario #3

COMPUTER CODE FOR L.P.: N/A

Revision No.	Date
1	10/25/02

Revision No.	Date

INSTRUCTIONAL SETTING: Simulator

APPROXIMATE DURATION: 1.5 Hour

PREPARED BY: General Physics Corp. 8/01/2002
Date

REVIEWED BY: _____ _____
Date

APPROVED FOR IMPLEMENTATION: _____ _____
Date

Facility:	**FENOC BVPS Unit 2**	Scenario No.: 3	Op Test No.: 2002-02
Examiners:	_____	Candidates:	_____ CRS
	_____		_____ RO
	_____		_____ PO
Objectives:	Demonstrate the ability to safely operate the plant during normal and upset conditions in accordance with plant procedures.		
Initial Conditions:	**IC 126 PW = NRC3:** 100% pwr, BOL, EQU XE, RCS boron = 1576 ppm, CB "D" = 225 steps.		
Turnover:	2FWE*P23B OOS, 2FWE*P22 aligned to "B" header.		
Critical Tasks:	**E-0.A, Manually trip reactor.** **ECA-0.0.B, Establish feedwater flow to at least one SG.**		

Event No.	Malf. No.	Event Type*	Event Description
1		R (RO) N (PO) N (US)	Normal power reduction.
2	CNH-PCS09B	I (RO) I (US)	Pressurizer level controller fails high.
3	XMT-CFW055A	I (PO) I (US)	Selected feedwater flow transmitter fails high.
4	EHC06	C (All)	Main turbine valve position limiter failure (Load rejection).
5	HIV01D	M (All)	Loss of 4KV bus "2D" (condensate pump and feed pump trip).
6	FLX CFW07		Pipe rupture in condensate header.
7	PPL01A PPL01B	C (RO)	Automatic reactor trip fails (manual trip available).
8	LOA AFW001 LOA AFW013		Turbine driven AFW pump (2FWE*P22) fails to start.
	DSG01B		EDG No. 2 trips during loading after powering 4KV bus "2DF".
9	BKR HIV01		Loss of 4160V bus "2AE" after entering ES-0.1.
	LOA DSG01	C (US)	EDG No. 1 fails to auto start (manual start available in ECA-0.0).
	PPL07A	C (PO)	2FWE*P23A fails to auto start on EDG sequencer, manual start successful.

(N)ormal, (R)eactivity, (I)nstrument, (C)omponent, (M)ajor

After the crew has lowered reactor power, the Master Pressurizer Level Controller fails high. Charging flow will increase causing actual Pressurizer level to rise. The crew must take manual control of Pressurizer level, halt the transient and restore level to program.

As Pressurizer level is being returned to normal, the selected feedwater flow transmitter fails high requiring manual control of feedwater flow to stabilize SG level.

Once conditions stabilize, a main turbine valve position limiter failure will result in a load rejection and the crew must stabilize the plant in accordance with the load rejection abnormal operating procedure.

When plant conditions have stabilized, a loss of 4160V bus "2D" results in a condensate pump and a main feed pump trip resulting in a reactor trip condition; however, automatic reactor trip will fail requiring the crew to manually trip the reactor.

Immediately following, a pipe rupture in the condensate header will cause a loss of suction to the remaining main feed pump. Additionally, the turbine driven AFW pump fails to start and will remain unavailable.

The loss of the 4160V bus "2D" also de-energizes 4160V bus "2DF". EDG No. 2 will start, but trips after briefly powering the "2DF" bus. After the crew enters ES-0.1, a loss of 4160V bus "2AE" occurs and EDG No. 1 fails to automatically start when the "2AE" bus is de-energized. EDG No. 1, however, can be manually started in ECA-0.0 allowing the "2AE" bus to be recovered and making motor driven AFW pump (2FWE*P23A) available.

Expected procedure flow path is E0 → ES-0.1 → ECA-0.0 → ES-0.1

Program Title 2002 NRC Examination Initial Conditions REV 1

INITIAL CONDITIONS: IC 126 PW = NRC3

100% pwr, EQU XE, BOL, CB "D" 225 steps, RCS boron = 1576 ppm.

ADDITIONAL LINEUP CHANGES	STICKERS	VOND MARKINGS
2FWE*P23B PTL	2FWE*P23B YCT	Fig 2OM 24-3: 2FWE*36 closed 2FWE*102 open
EQUIPMENT STATUS	**DATE/TIME OOS**	**TECHNICAL SPECIFICATION(S)**
2FWE*P23B OOS	24 hours ago	TS 3.7.1.2, Action b

SHIFT TURNOVER INFORMATION

1. 100% pwr, EQU XE, BOL, CB "D" 225 steps, RCS boron = 1576 ppm.
2. Reduce Power to remove 2FWS-P21B from service due to bearing high vibration.
3. Severe weather is expected
4. 2FWE*P23B is OOS for motor replacement and will not be returned this shift. 2FWE*P22 is aligned to the "B" header.

SCENARIO SUPPORT MATERIAL REQUIRED

Power reduction reactivity plan
Load Follow procedure 2OM-52.4.B step IV.B.1

INSTRUCTION GUIDELINES	PLANT STATUS OR RESPONSE	OBJECTIVE	EXPECTED STUDENT RESPONSE

Shift positions:

US _____

RO _____

PO _____

US assumes control and directs Operators to lower reactor power to 60%.

EVENT 1

Lower power ~ 5%.

Turbine load and reactor power lowering at 12%/hr or less.

Crew reviews/agrees with reactivity plan. US approves for use. Crew begins power reduction in accordance with the reactivity plan.

PO initiates turbine load reduction
RO initiates RCS boration as necessary to maintain Tavg-Tref

EVENT 2

At Examiner's direction insert:

IMF CNH-PCS09B (0 0) 100

Master Pressurizer Level Controller fails high.

Charging pump flow increases.

INSTRUCTION GUIDELINES	PLANT STATUS OR RESPONSE	OBJECTIVE	EXPECTED STUDENT RESPONSE
	Alarms expected: [A2-E3], Charging Flowpath Trouble [A2-D4], Reactor Coolant Pump Seal Trouble		RO notes indications and alarms, ~~US~~ informs US. US directs RO to place PRZR level controller or Charging Pump Discharge Control Valve in manual.
	PRZR Level Controller or Charging Pump discharge control valve in manual.		RO takes manual control of PZR level.
	Alarms clear.		US requests I&C to investigate Pressurizer Level controller failure.
EVENT 3 "C" SG Feed Flow Transmitter fails high.			
IMF XMT-CFW055A (0 0) 5	"C" SG Channel 3 Feed Flow Transmitter fails high.		PO acknowledges alarms, diagnoses problem, informs US.
Level Deviation Annunciator is dependent on operator action to manually control the "B" MFRV.	"C" SG MFRV FCV-FW-498 modulates shut "C" SG level lowers. Alarms expected: [A6-F11], Loop C Feedwater Flow > Steam Flow [A6-D11], SG 21C Level Deviation from Setpoint		

INSTRUCTION GUIDELINES	PLANT STATUS OR RESPONSE	OBJECTIVE	EXPECTED STUDENT RESPONSE
	FCV-FW-498 in manual.		US directs PO to take manual control of "C" MFRV and restore SG level to normal. Crew refers to applicable ARPs, and Instrument Failure Procedure, 2OM-24.41F. US informs I&C of SG steam flow transmitter problem.
EVENT #4 Insert: **IMF EHC06 (0 0) 50**	Load rejection to 50% limiter position (approx. 600 MW). RCS temperature rises. SG level deviation alarms. Condenser steam dumps open. Load rejection 15% - 50% status light A12-4A (C-7A actuated).		Crew recognizes load rejection. US directs operators to stabilize the plant and refers to AOP-2.35.2. US refers to AOP 2.35.2. RO checks auto rod insertion, or drives rods and/or borates to match Tavg vs. Tref. Crew sounds standby alarm and announces Unit 2 load rejection.

INSTRUCTION GUIDELINES	PLANT STATUS OR RESPONSE	OBJECTIVE	EXPECTED STUDENT RESPONSE
No EAL declaration is required.			SM evaluates EPP.
			Crew checks operation of EHC system.
	VPL failed low, vibration and load satisfactory for condition. EHC Control transfers from partial to full arc mode.		Crew checks if governor valves have closed in sequence, checks turbine vibration recorders, and EHC Control is transferring to full arc mode.
			Crew monitors for subsequent load reductions > 90 MWE
	Generator load > 270 MW Vacuum > 24.5 in Hg.		Crew checks if turbine should be tripped, verifies load is greater than 270 MW.
	Generator output breakers closed. Generator volts, amps, and p.f. satisfactory.		PO verifies if the main generator is on line
			RO checks Tavg - Tref within 5°F.
Crew may perform actions to recover GV control from the valve position limiter; 2OM-26.4.X is the appropriate procedure.	Load rejection bistables reset.		PO resets steam dump controller if necessary.
			Crew notifies System Operator of load loss and reason (if determined).

INSTRUCTION GUIDELINES	PLANT STATUS OR RESPONSE	OBJECTIVE	EXPECTED STUDENT RESPONSE
			US directs I&C to investigate problem with Valve position limiter.
	LR > 15%		US directs chemistry to sample as required for LR > 15%.
	2CNM-AOV100 closed.		Crew checks 2CNM-AOV100 closed.
	Supervisory limits normal.		PO monitors all turbine supervisory limits, refers to 2OM-26.4.ABD.
Continue with scenario when Tavg vs Tref is within 3°F OR when directed by evaluator.			
EVENT 5 Insert the following: **IMF HIV1D (0 0)**	Loss of 4KV bus "D".		Crew identifies loss of 4KV bus "D", 2FWS-P21B, 2CNM-P21C and 2CNM-P21A.
IMF FLX-CFW07 (1 0) 20000	Pipe rupture in Condensate Header.		
IMF PPL01A (0 0) 0 (preload) **IMF PPL01B (0 0) 0 (preload)**	Reactor fails to auto trip.		RO notes that a reactor trip has not occurred.
TDAFW pump trips during startup **IMF AFW03A (0 0) 5440 (preload)**			

INSTRUCTION GUIDELINES	PLANT STATUS OR RESPONSE	OBJECTIVE	EXPECTED STUDENT RESPONSE
			US refers to E-0 to verify immediate actions while RO and PO commence immediate actions.
			US directs RO to manually trip reactor.
CT#1 – E-0.A: **Crew manually trips reactor from the Control Room before performing the mitigation strategy of FR-S.1.**	Reactor trip.		RO manually trips reactor. **CT#1 S/U**
Steps 1 –7 of E-0 are immediate actions.			RO/PO commence IMAs of E-0, US reference E-0 to verify IMAs.
	Turbine trip due to reactor trip alarm A5-6D lit. Rod bottom lights lit. Neutron flux dropping.		RO verifies reactor trip.
			RO sounds standby alarm, announces Unit 2 reactor trip.
			SM evaluates EPP.
	Throttle or governor valves closed. Reheat stops or interceptors closed.		PO verifies turbine trip.

INSTRUCTION GUIDELINES	PLANT STATUS OR RESPONSE	OBJECTIVE	EXPECTED STUDENT RESPONSE
	MSR steam supply block valves closed. Reheat controller reset pushbutton depressed.		PO ensures reheat steam isolation.
	Output breakers open. Main generator volts ZERO. Exciter ACB open.		PO verifies generator trip.
IMF DSG01B (1 40) (preload)	2AE energized. 2DF de-energized, 2-2 EDG tripped during loading and will not be recovered.		PO verifies power to AC emergency busses, reports loss of DF bus and 2-2 EDG.
	No SI annunciator.		Crew checks if SI is actuated/required.
Immediate actions complete.	SI actuation status light not lit.		Crew dispatch operators to investigate loss of 2-2 EDG and 2FWE*P22.
Transition to ES-0.1	SI is not required.		US makes transition to ES-0.1 and informs the Control Room.
			SNA monitors status trees.
	No SI annunciator.		Crew checks SI not actuated.

INSTRUCTION GUIDELINES	PLANT STATUS OR RESPONSE	OBJECTIVE	EXPECTED STUDENT RESPONSE
WHEN APPROPRIATE report as turbine building operator that there is a large condensate header rupture just down stream of pumps discharge.	Maintain RCS temperature.		Crew checks/monitors T-avg.
NOTE: After report from field, crew may opt to secure condensate pumps.	Steam Dumps in Steam Press mode, RCS Tavg > 547°F and rising. Monitor RCS temperature.		PO places steam dumps in steam pressure mode. RO reports that Tavg is stable.
EVENT 6			
When steam dump control mode selector switch is placed in Steam Press position: **IMF BKR-HIV01 (2 0) 0 (preload)** **IRF LOA-DSG001 (5 0) 0 (preload)** **IMF PPL07A (2 1) 5 (preload)**	Loss of 2AE 4160V bus DG1 fails to auto start. 2FWE*P23A fails to auto start on EDG sequencer, manual start successful.		PO identifies loss of 2AE 4160V bus and reports loss to US. US determines no ESF busses are energized.
Crew enters ECA-0.0.			US makes transition to ECA-0.0 and informs Control Room.
When requested to check why No. 2 EDG tripped, report that the local Alarm No. 5 (overspeed trip) is actuated and there is physical damage to the EDG.	Diesel gen. 2-2 local panel trouble alarm A8-5E.		SNA monitors CSF status trees for information only.

INSTRUCTION GUIDELINES	PLANT STATUS OR RESPONSE	OBJECTIVE	EXPECTED STUDENT RESPONSE
	Annunciator A5-6D lit. Neutron flux dropping.		RO reverifies reactor trip.
			RO sounds standby alarm and announces Unit 2 loss of power.
			SM reevaluates the EPP.
	SLI manually actuated. MSIVs and bypass valves closed.		PO ensures steamlines isolated.
	Exciter and output breakers open.		PO verifies generator trip.
	PORVs closed. L/D isolated. RCPs stopped.		RO verifies RCS isolated, stops running RCPs.
WHEN APPROPRIATE report that 2FWE*P22 has physical damage to its trip throttle valve and it will not be returned.	AFW flow not indicated due to loss of all AFW pumps.		PO reports AFW system status, operators previously dispatched to investigate loss of 2FWE*P22.
			US dispatch operator to perform Attachments A-1.12 and A-1.11 to restore AFW flow.
	SR & IR channels aligned to 2NME-NR45.		RO verifies source range & intermediate NIs displayed on 2NME-NR45.

INSTRUCTION GUIDELINES	PLANT STATUS OR RESPONSE	OBJECTIVE	EXPECTED STUDENT RESPONSE
	No. 1 EDG starts manually and sequences loads **WITH EXCEPTION OF** 2FWE*P23A.		PO tries to start No. 1 EDG and reports it started and is sequencing loads.
Transition to ES-0.1	AE emergency bus energized.		US directs return to ES-0.1 step #5, (step in effect), based on repots of power restored to one 4KV Emergency bus.
NOTE: Crew may start 2FWE*P23A when AE bus is re-energized before transition to ES-0.1.	2FWE*P23A failed to auto start on 2-1 EDG sequencer.		PO reports no AFW pumps operating.
			US directs PO to manually start 2FWE*P23A feed SGs.
CT#2 – ECA-0.0.B: **Crew establishes the minimum required AFW flow rate to the SGs before SG dryout occurs.**	AFW flow restored to > 340 gpm.		PO starts 2FWE*P23A and restores feed flow to all SGs. **CT#2 S/U**
Terminate scenario when AFW flow is verified following transition to ES-0.1. **EPP** classification is **ALERT** based on EPP/I-1b **Tab 3.1, Loss of AC power.**	AFW flow > 340 gpm.		

INSTRUCTION GUIDELINES	PLANT STATUS OR RESPONSE	OBJECTIVE	EXPECTED STUDENT RESPONSE

SIMULATOR EVALUATION SCENARIO COVER PAGE

PROGRAM TITLE: Unit 2 LOIT NRC Exam

SUBDIVISION: BVPS Unit 2 Simulator

SCENARIO TITLE/NO.: NRC Scenario #4

COMPUTER CODE FOR L.P.: N/A

Revision No.	Date
1	10/25/02

Revision No.	Date

INSTRUCTIONAL SETTING: Simulator

APPROXIMATE DURATION: 1.5 Hour

PREPARED BY: General Physics Corp. 8/01/2002
Date

REVIEWED BY: _____ _____
Date

APPROVED FOR IMPLEMENTATION: _____ _____
Date

SIMULATOR EVALUATION SCENARIO COVER PAGE

PROGRAM TITLE: Licensed Operator Initial Training

SUBDIVISION: BVPS Unit 2

SCENARIO TITLE/NO. Scenario #4

COMPUTER CODE FOR L.P.

Revision No.	Date

Revision No.	Date

INSTRUCTIONAL SETTING: Simulator

APPROXIMATE DURATION: 1.5 Hours

PREPARED BY: General Physics Corp. 8/1/02

Date

REVIEWED BY:

Date

APPROVED FOR IMPLEMENTATION:

Date

Facility:	**FENOC BVPS Unit 2**	Scenario No. 4	Op Test No.: 2002-02
Examiners:	_____	Candidates:	_____ CRS
	_____		_____ RO
	_____		_____ PO
Objectives:	Demonstrate the ability to safely operate the plant during normal and upset conditions in accordance with plant procedures.		
Initial Conditions:	**IC 125 PW = NRC4**: 80% power, BOL, EQU XE, 1615 ppm boron, CB "D" = 172 steps.		
Turnover:	2FWE*P23B OOS. Perform a normal power reduction to remove "2A" Main Feed Pump from service.		
Critical Tasks:	**E-0.H, Start LHSI pump.**		
	E-0.O, Manually initiate CIB.		

Event No.	Malf. No.	Event Type*	Event Description
1		N (US) N (PO) R (RO)	Normal power reduction.
2	PMP FW4 PMP CFW008	C (All)	2FWS*P21A trips at approximately 77% power. 2FWS*P24 trips 3 minutes after being started.
3	PMP CCP01 PPL07B	C (RO) C (US)	Running CCP pump trips. Manually start standby CCP pump.
4	FLX CCP34	C (RO) C (US)	CCP supply leak to 2RCS*P21B (10 minute ramp to 450 gpm - leads to reactor trip).
5	RCS03B	M (All)	Large break LOCA.
6	 PPL07A PPL07B	 C (PO) C (US)	Both low head SI pumps fail to auto start (manual start available).
7	BST-PCS048 BST-PCS049 BST-PCS052	C (RO) C (US)	Auto CIB failure (manual available).

(N)ormal, (R)eactivity, (I)nstrument, (C)omponent, (M)ajor

The crew will lower power in preparation for removing a main feed pump from service; however, when power has been lowered to approximately 77%, the pump will trip and the startup feed pump will also subsequently trip requiring the crew to rapidly reduce power to less than 60% to avoid a reactor trip.

When plant conditions have begun to stabilize, the running component cooling pump trips requiring operator action to manually start the standby component cooling pump.

After starting the standby pump, a leak will develop on the supply line to 2RCS*P21B. The leak will ramp to 450 gpm over ten minutes requiring operator action to locate and isolate the leak. The Unit Supervisor should eventually direct a manual reactor trip.

Immediately following the reactor trip, a large break LOCA occurs. After completion of E-0 immediate actions, all RCPs should be manually tripped due to the LOCA.

Following the LOCA, Containment Isolation Phase "B" (CIB) will fail to actuate automatically requiring operator action to manually initiate CIB. Also both low head SI pumps fail to start automatically, but can be manually started by the crew.

Expected procedure flow path is E0 → E1.

Program Title 2002 NRC Examination Initial Conditions REV 1

INITIAL CONDITIONS: IC 125 PW = NRC4

IC 125 PW = NRC4: 80% power, BOL, EQU XE, 1615 ppm boron, CB "D" = 172 steps.

ADDITIONAL LINEUP CHANGES	STICKERS	VOND MARKINGS
2FWE*P23B PTL	2FWE*P23B YCT	Fig 2OM 24-3: 2FWE*36 closed 2FWE*102 open
EQUIPMENT STATUS	**DATE/TIME OOS**	**TECHNICAL SPECIFICATION(S)**
2FWE*P23B OOS	24 Hours ago	TS 3.7.1.2, Action b

SHIFT TURNOVER INFORMATION

1. 80% power, BOL, EQU XE, 1615 ppm boron, CB "D" = 172 steps.
2. Reduce Power to remove FW-P-2A from service due to bearing high vibration.
3. Severe weather is expected.
4. 2FWE*P23B is OOS for motor replacement and will not be returned this shift. 2FWE*P22 is aligned to the "B" header.

SCENARIO SUPPORT MATERIAL REQUIRED

Power reduction reactivity plan.
Load follow procedure 2OM-52.4.B, step IV.B.1.

	PLANT STATUS OR RESPONSE	OBJECTIVE	EXPECTED STUDENT RESPONSE

Shift positions:

US _____

RO _____

PO _____

EVENT #1

Lower Reactor Power to 75%.	Turbine load and reactor power reduction at 12%/Hr or less.	Following the Reactivity Plan, Crew lowers reactor power. US directs load decrease. Initiates Turbine load reduction. PO initiates turbine load decrease. RO initiates RCS boration as necessary to maintain Tavg-Tref.

EVENT #2

After power is lowered to 77% **IMF PMP-CFW004 (1 0) 1 (preload)**	2FWS-P21A trips.	PO recognizes feed pump trip and informs US.
IMF PMP-CFW008 (2 180) 1 (preload)	2FWS-P24 trips 3 min after startup.	

	PLANT STATUS OR RESPONSE	OBJECTIVE	EXPECTED STUDENT RESPONSE
			US refers to AOP-2.24.1, Loss of Main Feedwater. US verifies reactor power <90%.
	Alarm received: [A6-A10], SG Feed Pump 21A/B Auto Stop. 2FWS-P24 started.		Refers to ARPs as time permits. US directs starting 2FWS-P24, SG Startup Feed Pump. PO starts 2FWS-P24 and dispatches operator to locally check pump.
	2FWS-P24 trips 3 minutes after starting.		PO reports trip of 2FWS-P24 after starting.
	Turbine load reduction at 5%/minute.		US refers to AOP 2.51.1 and directs load decrease to < 60% at 5% / minute. PO decreases turbine load at 5% / minute. RO performs RCS boration to maintain Tavg-Tref.
At discretion of examiner, proceed with next event. **EVENT #3** (following are preloaded) **IMF PMP-CCP001 (0 0) 1** **IMF PMP-CCP002 (0 0) 1** **TRGSET 3 'XB4I009T ==1'** **TRG 3 'DMF PMP-CCP002'**	Running CCP Pump trips. Standby CCP Pump manually started.		PO manually starts standby CCP Pump.

	PLANT STATUS OR RESPONSE	OBJECTIVE	EXPECTED STUDENT RESPONSE
	Alarms Received: [A6-G1], Pri Comp Cooling Pump Auto Start/Auto Stop. [A6-H1], Pri Comp Cooling Water System Trouble.		
EVENT #4	CCP leak when standby pump started.		
IMF FLX-CCP34 (3 0) 450 600 (preload)	Decreasing CCP Surge Tank level on 2CCP*LI100B.		Determine CCP header leak inside containment.
	Increasing Containment sump levels.		US refers to AOP 2..15.1, Loss of Primary Comp. Cooling Water.
	Increasing RCP B motor and bearing temperatures.		
	1 CCP pump operating.		RO/PO Check CCP system status.
	Level control in manual with maximum makeup.		RO/PO Place Surge Tank Level Control Valve in MAN and adjust control signal to maximize makeup to Surge Tank level.

NOTE: Due to the rapidly degrading CCP system, it is expected that the crew will conservatively trip the reactor (based on surge tank level) and secure RCPs.

	PLANT STATUS OR RESPONSE	OBJECTIVE	EXPECTED STUDENT RESPONSE
			Crew monitors RCP Motor Bearing upper and lower temperatures for RCPs.
	Non-essential loads isolated.		Crew attempts to locate the leak.
	Surge tank continues to decrease.		Crew – If any RCP temperatures are approaching limits OR operating CCP pumps discharge pressure and current indicates cavitation, or if leakage is determined to be excessive:
	Cavitation of CCP pumps possible.		
	Leakage excessive.		Manually trip the reactor. Perform IMAs. Trip all RCPs.
EVENT #5 **(preloaded)** **IMF PPL07A (0 0) 4** **IMF PPL07B (0 0) 4** **IMF RCS03B (4 0)** **IMF BST-PCS048 (0 0) 2** **IMF BST-PCS049 (0 0) 2** **IMF BST-PCS052 (0 0) 2**	2SIS*P21A auto start failure. 2SIS*P21B auto start failure. DBA LOCA on reactor trip. Auto CIB failure. Auto CIB failure. Auto CIB failure.		US directs manual reactor trip.
			RO manually trips reactor.
Steps 1 - 7 of E-0 are immediate actions.	Rod bottom lights lit. Neutron flux dropping. First Out: A5-6D, TURBINE TRIP DUE TO REACTOR TRIP.		RO verifies reactor trip.

	PLANT STATUS OR RESPONSE	OBJECTIVE	EXPECTED STUDENT RESPONSE
			RO sounds standby alarm, announces Unit 2 reactor trip.
			SM informed to evaluate EPP.
	Throttle or governor valves closed, reheat stops or interceptors closed.		PO verifies turbine trip.
	MSR steam supply block valves closed. Reheat controller reset pushbutton depressed.		PO ensures reheat steam isolation.
	Main generator output breakers open. Main Gen volts zero. Exciter circuit breaker opens.		PO verifies generator trip.
	2AE and 2DF busses energized.		PO verifies power to at least one AC emergency bus.
E-0 immediate actions completed.	SI actuated.		RO checks if SI is actuated, manually actuates SI pushbuttons.
	Manual reactor trip resulted in a DBA LOCA on RCS Loop B.		US directs manual trip of all RCPs.
	RCS pressure, PZR level off scale low. CNMT parameters degrade rapidly.		RO trips all RCPs.

	PLANT STATUS OR RESPONSE	OBJECTIVE	EXPECTED STUDENT RESPONSE
			US direct operators to verify automatic actions by performing Attachment A-0.11, "Verification of Automatic Actions" when time permits.
	Automatic actions of A-0.11 are SAT with the following exceptions: **2FWE*P23B OOS at turnover.** **Both LHSI pumps failed to auto start and were manually started. (CT#1)** **CIB failed to auto actuate and was manually actuated. (CT#2)**		Operator assigned to perform Attachment A-0.11 reports status of Attachment to US/crew and any actions taken when completed.
<u>CT#1 – E-0.H:</u> **Crew manually starts at least one low head ECCS pump before transition out of E-0.**	LHSI pumps manually started.		PO manually starts both LHSI pumps during performance of Attachment A-0.11 and reports actions to US when complete. **CT#1 S/U**

	PLANT STATUS OR RESPONSE	OBJECTIVE	EXPECTED STUDENT RESPONSE
CT#2 – E-0.E: **Crew manually actuates at least the minimum required complement of containment cooling equipment before an Extreme (red path) challenge develops to the Containment CSF.**	CIB/Spray manually actuated.		PO manually actuates CIB & CNMT Spray during performance of Attachment A-0.11 and reports actions to US when complete. **CT#2 S/U**
	Leak collection filtered exhaust fan status SAT.		Crew verifies Leak collection filtered exhaust fan status.
	Plant rapidly cooled down due to DBA LOCA.		RO reports RCS cold leg temperature and cooldown caused by LOCA.
	Recirc spray pumps will start after CIB and appropriate time delay.		RO checks recirc spray pump status.
	RCS Pressure at CNMT pressure due to DBA LOCA.		
	PZR PORVs, Safeties, Spray Vlvs closed.		RO checks PZR isolated. PRT conditions normal.
	PORVs/block vlvs alignment sat.		RO verifies PORV alignment sat.
	RCPs previously secured.		RO reports RCP status.
	SGs not faulted.		Crew determines no faulted SGs.

	PLANT STATUS OR RESPONSE	OBJECTIVE	EXPECTED STUDENT RESPONSE
	SG Tubes intact.		Crew determines no SGTR event in progress.
Transition to E-1.	CNMT parameters not consistent with pre-event, indicate large LOCA in progress.		US enters E-1 and announce entry to Crew.
	CIB actuated.		PO checks Control Room habitability systems actuated.
	RCP's previously secured.		RO reports RCP status.
	Recirc spray pumps operating.		RO reports Recirc Spray pmp status.
	Both CNMT hydrogen analyzers operating.		RO reports H2 analyzer status.
	No S/G's faulted.		PO checks if S/G's are faulted.
	AFW flow > 340 gpm.		PO checks intact S/G levels and control levels.
	Power available to block valves. PORV/Block vlv alignment sat.		RO checks PORV and block valves alignment.
	No SG levels rising in an uncontrolled manner. Subcooling < 43°F.		PO checks if SG tubes are intact. Crew checks if SI flow can be terminated.

	PLANT STATUS OR RESPONSE	OBJECTIVE	EXPECTED STUDENT RESPONSE
	Adequate secondary heat sink.		Crew determines SI flow CANNOT be terminated.
Terminate the scenario when the crew determines that SI flow cannot be terminated.	RCS pressure NOT stable or rising.		

US evaluates **EPP** and declares **ALERT due to Loss of RCS Barrier (TAB 1.2).**